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EXAMINER	
LY, CHEYNE D	
ART UNIT	PAPER NUMBER
1631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/558,232	MANYAK ET AL.	
	Examiner	Art Unit	
	Cheyne D Ly	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *October 19, 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-56,58-105,107,108,110-129 and 132-145* is/are pending in the application.

4a) Of the above claim(s) *4-9,11-13,24-26,29-32,58,65,66,69 and 111-119* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,10,14-23,27,28,33-56,59-64,67,68,70-105,107,108,110,120-129 and 132-145* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-56,58-105,107,108,110-129 and 132-145* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Pubmed Search Results*.

DETAILED ACTION

1. Applicants' arguments filed October 19, 2004 have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

2. The addition of new claims 143-145 has been acknowledged.

3. Claims 1-3, 10, 14-23, 27, 28, 33-56, 59-64, 67, 68, 70-105, 107, 108, 110, 120-129, and 132-145, system comprising a memory of data about compounds and targets with interaction information, known compounds with known biological activity, have failed in pre-clinical or human clinical test, and molecular targets which include receptors, are examined on the merits.

4. NON-FINAL OFFICE ACTION.

PRIORITY

5. Applicant's claim to the priority benefit of U.S. provisional application Serial No. 60/130,992 has been accepted.

NEW MATTER TO THE SPECIFICATION

6. The amendment filed October 19, 2004 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows:

7. On page 2, the amendment to the specification to recite "[t]he present application...60/130,992..., which is incorporated by reference in its entirety" is improper. No where in the instant application does the specification, as originally filed, recite the statement that Provisional Application No. 60/130,992 is "hereby incorporated by reference." Therefore, the instant amendment is improper under 35 U.S.C. 132 as discussed above. Applicant is required to cancel the new matter in the reply to this Office Action.

8. The attempt to incorporate subject matter in the amendment, filed September 10, 2003, (Figures 1C, 1D, 2A, 3A, 7A, 7B, 7C, 8A, and 8B, pages 16, 17, 19, 20, 22, 23, 26, 29, and 33) into this application by reference to Provisional Application No. 60/130,992 is improper. Provisional Application No. 60/130,992 is not supported by the instant specification (pages 13-15) as originally filed as a document that has been incorporated by reference. No where in the instant application does the specification recite the statement that Provisional Application No. 60/130,992 is "hereby incorporated by reference." Further, Applicant asserts that Applicant has claimed priority to said Provisional Application No. 60/130,992 in the instant specification (See page 303 of the response filed September 10, 2003). It is noted that the instant specification claims priority to Provisional Application No. 60/008,660 as indicated by page 2 of the instant specification as originally filed. The proposed subject matter to be incorporated has not been found in the priority document Provisional Application No. 60/008,660. Applicant is required to cancel the new matter in the reply to this Office Action.

RESPONSE TO ARGUMENT

9. On pages 43-46, Applicant noted that the "Examiner correctly notes that the reference to Provisional Application No. 60/008,660 was incorrect." Further, Applicant argues that the amendment to the specification filed October 19, 2004 is proper as on the first paragraph on page 46. Applicant's argument has been fully considered found to be unpersuasive because the discussion on pages 43-46 does not change the fact the specification as originally filed recites "hereby incorporated by reference" (page 2) which specifically directed to Provisional Application No. 60/008,660, but not to Provisional Application No. 60/130,992 as proposed by Applicant.

CLAIM REJECTIONS - 35 USC § 101

10. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

11. Claims 44-49, 52-56, 133-138, and 143 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory algorithm type subject matter.

12. This rejection is maintained with respect to claims 44-49, 52-56, 133-138, as recited in the previous office action mailed May 19, 2004. The instant rejection has been extended claim 143 as necessitated by claim amendments.

13. Claims 44-49, 52-56, 133-138, and 143 are rejected because said claims are directed to a computer system, memory for storing data, and database, comprising steps for correlating data without any physical alteration step, which is considered to be non-statutory subject

matter. "For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory." (MPEP § 2106 (IV)(B)(2) (b), part ii). Similar to the nonstatutory example above, the instant invention comprises algorithmic steps for correlating data without any physical alteration resulted from said analysis steps. Further, the instant invention is directed to steps for correlating data without any physical alteration of said data outside of said computer system, memory for storing data, or database.

RESPONSE TO ARGUMENT

14. It is noted that the claim amendment to claim 37 has caused claims 37 and 41-43 to be withdrawn from the instant rejection.

15. Specific to claims 44-49, 52-56, 133-138, and 143, Applicant argues that the claimed invention is directed to statutory subject matter as supported by State Street Bank & Trust Co. v. Signature Financial Group Inc. (page 48). Applicant's argument has been fully considered and found to be unpersuasive.

16. Specific to State Street Bank & Trust Co. v. Signature Financial Group Inc., "the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces" a useful, concrete and tangible result"--a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades."

However, the claimed invention as recited by claims 44-49, 52-56, 133-138, and 143 does not require any transformation steps the data.

17. It is noted that Applicant has amended claims 44 and 46 have the limitation of "the information reflecting information the relationship..." Claim 133 has the limitation of "the process provides..." However, said limitations have been reasonably construed as routine computer processing of data to be stored within said computer without any transformation for producing "a useful, concrete and tangible result." Further, the limitation of "reflecting the relationship" does not cause any transformation of said data.

CLAIM REJECTIONS - 35 USC § 112, FIRST PARAGRAPH

18. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

19. Claims 61, 64, 67, 68, 77, 78, 87, 89, 96, 102, 108, 110, and 133-138 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

20. THIS IS A NEW MATTER REJECTION.

RESPONSE TO ARGUMENT

21. On page 51, Applicant argues that "it was the Examiner's suggestion along with Examiner Ardin Marschel, at the personal interview conducted on February 3, 2004, to

include claims with similar language". Applicant's argument has been fully considered and found to be unpersuasive because at the time of the interview Applicant was reminded that any amendment resulted from said interview would be examined for the introduction new matter to the specification originally filed.

22. On page 53, Applicant argues that page 29, lines 15-29, and page 30, lines 2-4, provide written basis support for the limitation of "a majority of the compounds" or "a majority of a plurality of compounds". Applicant's argument has been found to be unpersuasive because the pointed to disclosure does not provide written basis support for said limitation as recited in claims 61, 64, and 138.

23. On page 54, Applicants argue to overcome said rejection as directed to claims 67, 68, 77, 78, 87, 89, 96, 102, 108, and 110 by amending said claims to recite limitations that have been disclosed in the Provisional Application (60/130,992), which has been asserted by Applicant to be incorporated by reference. Applicants' argument has been fully considered and found to be unpersuasive due to the subject matter being submitted in the said amendment has been determined to be improper as discussed above. On page 55, Applicant argues that claims 77, 87, and 110 are only rejected under 35 U.S.C. §112, first paragraph wherein said rejection has been overcome. Applicant's argument has been found to be unpersuasive because said rejection directed to claims 77, 87, and 110 has not been overcome as discussed above.

24. On pages 54 to 55, Applicant argues that the claimed invention is directed to "data corresponding to compounds and records may be stored in records which is "effectively acting to identify the different compounds and targets." Applicant's argument has been fully considered and found to be unpersuasive because storing is not the same as the limitation of "identified" as required by claims 133 to 138.

CLAIM REJECTIONS - 35 USC § 102

25. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

26. Claims 54-56 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Gwchwend et al. (1996).

27. Gwchwend et al. discloses the use of the DOCK software program, MDL Information Systems for MACC-3D, and the FCD and ACD structural databases (page 178, column 1, DOCK §, and page 184, column 2, Acknowledgements §). Gwchwend et al. discloses forty structurally distinct compounds (compound set) were assay for activity against *P. carinii* and human dihydrofolate reductase (target set). Of these, nearly half show significant inhibition, greater than 20% at an inhibitor concentration of 100 uM. Roughly one quarter demonstrated IC_{50} values at or better than 100 uM (full-ranking from interaction results) (page 178, column 2, Results §). Gwchwend et al. discloses that the method should exhibit structural diverse set of receptor-ligand complexes (all possible combinations) (page 181, column 1, Scoring philosophy), as in instant claim 54.

28. Figure 2 disclose the inhibition potency resulted from the distinct compounds binding to dihydrofolate reductases (page 178, column 2, Results §, and page 179, Figure 2), as in instant claims 55 and 56.

CLAIM REJECTIONS - 35 USC § 103

29. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

30. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

31. Claims 1-3, 10, 14-23, 27, 28, 33-53, 59-64, 70-76, 78, 80, 89-91, 93, 94, 97-105, 120, 121, 124, 125, 127-129, and 132-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. (1998) taken with Antman et al. (1992).

RESPONSE TO APPLICANT'S ARGUMENT

32. Specific to Applicant's argument on page 56, ¶ 2, Applicants' claim to the priority benefit of U.S. provisional application Serial No. 60/130,992 has been accepted. Therefore, the Bult et al. reference has been withdrawn from the instant rejection.

33. On page 56, 3rd ¶, Applicants noted "that Antman et al. was only used by the Examiner to allege a teaching of a first database of chemical compounds that have failed in preclinical or human clinical tests. However, none of independent claims...include this feature." It is noted that the elected species are a system comprising a memory of data about compounds and targets with interaction information, known compounds with known biological activity, have failed in pre-clinical or human clinical test, and molecular targets which include receptors. The elected claims are examined with elected species read into said claims.

34. On pages 56-59, Applicants argue that "Goto et al. in view of Bult et al. and Antman et al. do not disclose (or suggest) the claimed combination of elements." Applicants' argument has been fully considered and found to be unpersuasive. It is noted that the limitation of "computer system" has not been specifically defined by in the specification. Therefore, said limitation has been reasonably construed as a network of interconnecting computing components including computers and databases such as the World Wide Web. Therefore, the citation of Goto et al. (1998) taken with Antman et al. (1992) as directed to Internet based systems connected via the World Wide Web could be reasonably interpreted, by one of ordinary skill in the art at the instant time of the invention, as a "computer system." For

example, KEGG is a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank (Goto et al., Abstract etc., page 594, column 2, Results and Discussion §). The inclusion of Ogata et al. is not being used as prior art, but only to discuss that KEGG comprises GenBank and Medline databases via additional links (Ogata et al., page 30, Table 1). Antman et al. supports that MEDLINE database comprises information directed to clinical control trials using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line). Therefore, at the time of the instant invention, a search for key terms of "interactions, compounds, and test results" in Medline via KEGG would demonstrate that KEGG via MEDLINE comprises results directed to interaction data (Search results provided). For example, Lin et al. (Result 2) describes the interactions between a drug and a DNA target (Lin et al., Abstract etc.).

35. Specific to the argument on page 58, 2nd ¶, Applicants argue that "claim 1 provides for a database containing records corresponding to screening results from tests of interactions between each of a plurality of compounds in a first database and each of a plurality of molecular targets in a second database." It is noted that claim 1 is directed to a first database containing records corresponding to a plurality of chemical compounds and second database containing records corresponding to a plurality of molecular targets. The limitation of "plurality" in the respective databases has been reasonably construed as more than one chemical compounds or molecular targets. Therefore, the limitation of "interactions between each of a plurality of compounds in a first database and each of a plurality of molecular

targets in a second database" has been reasonably construed as a database containing records as directed to interactions of more than one chemical compounds or molecular targets. The cited description of KEGG by Goto et al. is consistent with the argued limitation as discussed below.

36. On pages 59-61, Applicants argue that "KEGG and affiliated databases discussed in Goto et al. are designed to incorporate individual components of natural biological systems" and "the relationships among the components are made by association, not by measurement." Further, the claimed invention is directed to records directed compounds and molecular targets, and their interaction. The description of the compound , molecular target, and interaction databases of Goto et al. is consistent with the limitations in the claimed invention.

37. On page 62, Applicants' argument directed to Antman et al. has been fully considered and found to be unpersuasive. It is noted that Antman et al. describes the MEDLINE search resulted in records directed to lidocaine and calcium channel blockers wherein the RCT data suggest that these therapies are not effective and may actually be harmful (Abstract etc., and page 243, first column, 2-12). Therefore, the citation of Antman et al. is consistent with the required limitations of claim 17.

38. Specific to Applicants' argument on pages 62 to 69 directed to the "third database", it is noted that the limitation of "computer system" has not been specifically defined by in the specification. Therefore, said limitation has been reasonably construed as a network of interconnecting computing components including computers and databases such as the World

Wide Web. Therefore, the citation of Goto et al. (1998) taken with Antman et al. (1992) as directed to Internet based systems connected via the World Wide Web could be reasonably interpreted, by one of ordinary skill in the art at the instant time of the invention, as a "computer system." For example, KEGG is a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank (Goto et al., Abstract etc., page 594, column 2, Results and Discussion §). The inclusion of Ogata et al. is not being used as prior art, but only to discuss that KEGG comprises GenBank and Medline databases via additional links (Ogata et al., page 30, Table 1). Antman et al. supports that MEDLINE database comprises information directed to clinical control trials using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line). Therefore, at the time of the instant invention, a search for key terms of "interactions, compounds, and test results" in Medline via KEGG would demonstrate that KEGG via MEDLINE comprises results directed to interaction data (Search results provided). For example, Lin et al. (Result 2) describes the interactions between a drug and a DNA target (Lin et al., Abstract etc.).

39. Specific to the argument on pages 70-74, and amended limitation of claim 44, lines 10-11, claim 46, lines 11-14, and claim 139, lines 17-20, a search for key terms of "interactions, compounds, and test results" in Medline via KEGG by one of ordinary skill in the art would demonstrate that results of interactions are present in MEDLINE (Search results provided). For example, Mascolini M. (Result 1) describes the FDA approved drugs and drugs in clinical trials (new drugs) are characterized as protease inhibitors (binding capability) for the

treatment of AIDS as characterized by their test results (Abstract etc.). Lin et al. (Result 2) describes the interactions between a drug and a DNA target (Lin et al., Abstract etc.).

40. On pages 74-77, Applicant's argument directed to the limitation of "measure an interaction between all possible combinations of chemical compounds...thereby creating a full-rank data set of test results" in claim 54 has been found to be persuasive.

41. It is noted that claims 60, 63, and 137 have been amended to delete the limitation of "all or substantially"; however, said amendment has not cause the claim to overcome the instant prior rejection. The "all" limitation is directed to the "compounds selected" or "molecular targets selected" which is consistent with the cited disclosure discussed below.

BASIS OF REJECTION

42. KEGG as a computerized database of mechanisms of gene functions and cellular functions in terms of the information pathways that consist of interacting genes or molecules (Page 591, Column 1, Lines 23-26). LIGAND is accessible through the KEGG systems (processor) via the Japanese GenomeNet database (storage memory) and the LIGAND database is downloadable (page 591, column 1, Availability §).

43. COMPOUND (first database) comprises all chemical compounds identified by accession numbers that appear in ENZYME such as substrates, products, inhibitors, cofactors, and effectors with their respective reaction data (effect) (page 593, column 2, COMPOUND section). Goto et al. include compounds from living cells (biological systems) and all

compounds that are related (effect) to known metabolic pathways into the COMPOUND database (page 595, column 1, lines 1-9), as instant claim 1, lines 1-4; claim 33, lines 1-3; claim 35, lines 1-4; claim 37, lines 1-4; claim 44, lines 1-3; claim 46, lines 1-3; claim 59, lines 1-3; claim 132, lines 1-3; and claim 139, lines 1-4.

44. Goto et al. discloses ENZYME (second database) comprising the description of enzymes identified by EC numbers (molecular targets) and the reactions it catalyzes, and the collection of chemical compounds that are related to the enzyme (page 592, column 2, ENZYME section), as in instant claim 1, lines 5-6; claim 33, lines 1-3; claim 35, lines 5-6; claim 37, lines 5-6; claim 44, lines 4; claim 45, lines 5-6; claim 46, lines 5-6; claim 49, claim 59, lines 4-5; claim 132, lines 4-5 and claim 139, lines 5-6.

45. Goto et al. discloses KEGG pathway database (third databases) (Figure 3) wherein KEGG makes "connections between the factual data for individual molecules, i.e., gene and gene products, and the biological relationships among them, i.e. molecular interactions and molecular pathways" (page 595-596, Pathway reconstruction with LIGAND §). KEGG (third database) generates pathway diagrams (records) via LIGAND and makes the connection of two neighboring enzymes (second database) on the metabolic pathway which is the result of the common compound that is both the product of the first reaction and the substrate of the second reaction. The network of enzymes (second database) can be computed by generating networks of chemical compounds from a set of substrate-product relationships (biological information related to effects on a biological system). It is possible to generate all possible paths for all compounds (first database) (page 596, columns 1-2, Path

computation of LIGAND §). Goto et al. identifies new chemical compounds (screen results) appearing in these reactions and add them as new COMPOUND entries. "The reactions and compounds (screening results) are also stored in the relational database for the main purpose of pathway computation (page 597, column 1, Organization of LIGAND §) via KEGG (third database), as in instant claim 1, lines 7-13; claim 33, lines 6-12; claim 35, lines 7-9; claim 37, lines 7-13; claim 44, lines 5-6; claim 45, lines 7-8 and 11-15; claim 46, lines 7-10; claim 59, lines 6-8; claim 60; claim 61; claim 132, lines 6-12; claim 133 and claim 139, lines 7-12.

46. It is note that the inclusion of Ogata et al. is not being used as prior art, but only to expand on the properties of KEGG. The KEGG biochemical pathways include Ligand-Receptor Interaction (Page 30, Table 2, Cell Processes) as in instant claims 10.

47. KEGG (third database) via LIGAND is intended to give all possibilities, from which the user can maker further reasoning (new information) based on the parameter constraints (threshold) (page 597, column 2, lines 6-13), as in instant claim 23; claim 44, lines 7-10; claim 46, lines 11-12; claim 137; and 138.

48. The results are in a Webpage (user interface) comprising chemical structure as directed to the enzyme (second database) and compounds (first database) (page 598, column 1, lines 3-9, and figures 1-2), as in instant claim 1, lines 14-17; claim 33, lines 13-16; claim 35, lines 10-13; claim 38; claim 39; claim 40; claim 50; claim 51; claim 52; claim 59, lines 9-12; claim 63; claim 64; claim 132, lines 13-16; and claim 139, lines 1-4.

49. Enzyme entry contains links to GENES database (fourth database) and DISEASE fields describes human genetic disorders as directed to enzymes, which is linked to OMIM database (fourth database) (page 593, column 1, lines 1-19), as in claim 45, lines 9-10; and claim 62.

50. Goto et al. teaches "new activities of computational functional genomics that include the identification of biological functions of unknown gene products,...comparative analysis of genes and genomes in different species, and analysis and simulation of gene expressions in different cells or in different developmental stages. In order to facilitate such post-genomic sequencing analyses, it has become a high priority to construct a new breed of database that defines functional aspects of genes, cells and organisms" (Page 591, Column 2, Lines 12-22), as in instant claims 78, 128, and 129.

51. The sequence data is captured from recent progress in genome sequencing from bacteria to eukaryotes (screening process) as directed to biological functions (page 591, column 2, lines 9-22), as in instant claims 70 and 76.

52. "A schematic diagram showing LIGAND as an interface of KEGG (Kyoto Encyclopedia of Genes and Genomes) and DBGET/LinkDB systems as well as an interface of biological and chemical databases" (Figure 3, page 596). LIGAND comprises data directed to PIR superfamily (page 597, column 1, lines 11-14), as in instant claim 124.

53. KEGG makes connections between the factual data for individual molecules, i.e. genes and gene products, and the biological relationships among them, i.e. molecular interactions and molecular pathways" (Page 595, Column 2, Lines 1-2 and Page 596, Column 1, Lines 1-4), as in instant claims 104 and 127.

54. The KEGG project includes databases such as PATHWAY, COMPOUND, GENES and interaction databases such as ENZYME for enzymatic reactions and BRITE for molecular interactions in general. Specific to the BRITE database, molecular interactions may include those determined from the yeast two-hybrid system for protein-protein interaction (binding) (Page 597, Lines 32-46). Table 3 illustrates records from KEGGS corresponding to enzyme (molecular targets) group by species source (page 595), as in instant claims 3, 27, 41, 42, 103, 125, and 135.

55. "LIGAND now consists of two sections: the expanded ENZYME section and the new COMPOUND section...The COMPOUND section is a collection of metabolic compounds, including substrates, products, inhibitors, cofactors and effectors, and other chemical compounds that play important functional roles in living cells" (Page 592, Column 1, Lines 49-53), as in instant claim 2.

56. "Each compound is given an accession number in the ENTRY field, which is followed by the compound name and its synonyms in the NAME field, and the molecular formula in the FORMULA field." The DBLINKS field includes the CAS registry (Page 593, Column 2, Lines 10-28), as instant claims 14, 15, and 18-22.

57. Tables 1 and 2 disclose the number of links from ENZYME to other databases where users can view information for enzymes whose roles in the metabolic pathways are known and whose sequences and three-dimensional structures have been determined (Page 594, Column 2, Lines 13-17), as in instant claims 97, 98, and 120.

58. The number of entries such as inhibitors or effectors (known biological activity) and links in COMPOUND are disclosed in Table 4 (Page 595), as in instant claims 28, 34, 36, 42, 43, 47, 48, 99, and 134.

59. "The LIGAND database thus provides fundamental data on both biological and chemical aspects of life" (Page 592, Column 2, Lines 4-5). "The DISEASE field describes human genetic disorders caused by a lack of or mutation of the enzyme, which is linked to the OMIM database. The MOTIF field describes the protein sequence motifs that are linked to PROSITE...and the STRUCTURE field contains the code names of the protein three-dimensional structures in the Protein Data Bank" (Page 593, Column 1, Lines 11-19). "The chemical structure is entered in our database in the MDL MOL file format, which can also be downloaded in DBGET/LinkDB to launch a helper application, such as ISIS/Draw, to view and manipulate the structure (related methods), as in instant claims 89-91, 93, 94, and 143.

60. The COMPOUND section is constructed manually, except for the link information to ENZYME and KEGG/PATHWAY, by consulting with various sources, such as the Merck Index (Budavari, 1996), and dictionaries of biochemistry and organic chemistry" (Page 593, Column 2, lines 28-32).

61. The inclusion of a document containing the description of the Merck Index is provided to support and expand on prior art cited from Goto et al. The Merck Index has the following type of information available: biological products, environmentally significant compounds, and natural products. "The MERCK INDEX ONLINE is made available through major online database vendors" (Page V, Lines 13-15 and 31-32), as in instant claim 16.

62. Specifically, the drug information disclosed in the Merck Index include the following: compound name, compound type, references to pharmacological or biological activity, clinical trials, toxicity studies, structure, and physical data which includes solubilities determined at room temperature, therapeutic category, metabolism in humans (Page ix and Page x, Lines 17-19, Structure section, Physical Data section, and Literature References section), as in instant claims 53, 100-102, 140, and 141.

63. "LIGAND database provides the enzyme classification according to EC number...For instance, the sequence similarity can be used to define a hierarchical classification of families and superfamilies of functionally related proteins...The sequence and structural motifs that have been extracted from groups of enzymes with similar functions can also be considered as a functional hierarchy" (Page 596, Lines 24-26 and 30-33), as in instant claims 105 and 121.

64. Further, LinkDB provide access to ATPase EC 3.6.1.3, which is further linked to literature source via the ENZYME nomenclature database (ExPASy) that provide disclosure for ATPase in regard to binding and inhibition assays. A document by Liu et al. (1997) is provided not as prior art but only as disclosure to the data that is accessible via LinkDB. From LinkDB, EC 3.6.1.3 provides a link to reference literature via ExPASy specific to ATPase. For example, Liu et al. discloses "the assay uses Mg2+ ions to permeabilize membrane vesicles or proteoliposomes, thus allowing access of ATP to both sides of the bilayer. HisQMP2 displays a low level of intrinsic ATPase activity in the absence of HisJ; unliganded HisJ stimulates the activity and liganded HisJ stimulates to an even higher level. All three levels of activity display positive cooperativity for ATP with a Hill coefficient of

2 and a K0.5 value of 0.6 mM. The activity has been characterized with respect to pH, salt, phospholipids, substrate, and inhibitor specificity. Free histidine has no effect" (Abstract). "Vanadate, a potent inhibitor of P-type ATPases and histidine transport, inhibits the activity of HisQMP2, giving 50% inhibition (potency) at 6.5 μM. Bafilomycin A1 (100 μM), oubain (up to 3 mM), and NaN3 (10 mM) do not inhibit" (Page 21887, column 2, lines 23-28), as in instant claims 71-75, 80, and 136.

65. However, Goto et al. (1998) does not disclose the limitation of a first database of chemical compounds that have failed in preclinical or human clinical tests, as in instant claims 17 and 142, and as an option of the elected subject matter species.

66. Antman et al. discloses an improvement for "better databases" for the treatment of patients in clinical trials (page 240, Conclusions §). The method of Antman et al. comprises literature search for meta-analyses and randomized control trials using the MEDLINE database (page 241, column 2, last paragraph). The searches resulted in data directed to treatments that have no effect on mortality or are potentially harmful (page 240, Data Synthesis §) and "negative trial, suggesting that the treatment does not work" (failed in human clinical tests) (page 246, column 1, "Negative" RCTs §). Antman et al. supports that the MEDLINE database comprises information directed to treatment therapies using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line), as in instant claims 17 and 142.

67. The citation of Goto et al. (1998) taken with Antman et al. (1992) as directed to Internet based systems connected via the World Wide Web could reasonably be interpreted, by one of

ordinary skill in the art at the instant time of the invention, as a "computer system." For example, KEGG is a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank (Medline) (Goto et al., Abstract etc., page 594, column 2, Results and Discussion §). Antman et al. supports that the MEDLINE database comprises information directed to clinical control trials using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line).

68. An artisan of ordinary skill in the art at the time of the instant invention would have been motivated by Antman et al. to recognize that clinical trial data corresponding to interaction test results are available in MEDLINE. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the KEGG computer system comprising MEDLINE to search for interaction test results and clinical trial data as taught by Goto et al. and Antman et al.

69. Claims 1, 10, 17, 59, 67, 68, 79, 81-88, 92, 95, 108, 110, 122, 123, 144 and 145 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (1999) taken with Antman et al. (1992).

RESPONSE TO ARGUMENTS

70. Specific to Applicants' arguments on pages 78-82, it is noted said arguments are similar to those presented for KEGG as described by Goto et al. in combination with Antman et al. above. Further, Ogata et al. and Antman et al. have been cited for describing KEGG in the

instant rejection. Applicants' arguments have been fully considered and found be unpersuasive. Applicant is directed to respond directed to KEGG discussed above.

71. Specific to Applicants' remarks directed to claims 144 and 145 on page 42, the limitations of LOPAC, United States Pharmacopeial Convention Inc.'s USP DI Series, and SMILES codes are directed to nonfunctional descriptive material. The limitations are directed to compilation of facts or data merely stored to be read without creating any functional interrelationship with the claimed subject matter. The MPEP states that when descriptive material is not functionally related to the substrate, the descriptive material will not distinguish the invention from the prior art in terms of patentability. See MPEP 2106, §VI. Therefore, the cited disclosure of Ogata et al. is consistent with the required critical limitations claims 87, 88, 95, 144, and 145.

BASIS FOR REJECTION

72. Ogata et al. discloses KEGG is tightly integrated with the LIGAND chemical database for enzyme reactions as well as with most of the major molecular biology databases by the DBGET/LinkDB system" (Page 29, Column 2, Lines 1-6).

73. The inclusion of citations from Goto et al. is not being used as prior art, but only to expand on the capabilities of LIGAND, which is disclosed by Ogata et al. The disclosure of Goto et al. discussed above (paragraphs 33-39) anticipates the limitations of claims 1 and 59 as directed to the first, second, and third database comprising interaction data between compounds and molecular targets.

74. Ogata et al. discloses "co-linearity of genes between two genomes is quite useful for identification of clusters of orthologous genes. KEGG provides the comparative genome

map for identification of such clusters and for functional annotation of newly sequenced genomes (Page 33, Column 1, Lines 33 and Figure 3). Table 3 shows the list of currently available tools such as gene cluster search and sequence similarity search for search and analysis of KEGG pathway maps and genome maps (Page 33, Column 2, Lines 54-55), as in instant claims 122 and 123.

75. The KEGG biochemical pathways include Ligand-Receptor Interaction (non-steroidal) (Page 30, Table 2, Cell Processes) as in instant claims 10, 67, 68, 108, and 110.

76. "Thus, it is easy to see how the information of gene expression profiles can be used as still another constraint against the KEGG reference pathway maps. In fact, KEGG provides a tool to color the pathway maps in order to visualize, for example, the microarray patterns of gene expression profiles" (Page 33, Column 2, Lines 48-53). It is inherent in such techniques as the yeast two-hybrid system (page 34, column 1, lines 32-37) and microarray expression assays that interactions are determined by some potency value or compared to some specified threshold value, as in instant claims 79 and 81-86.

77. Specific to claims 87, 88, 95, 144, and 145, the limitations of LOPAC, United States Pharmacopeial Convention Inc.'s USP DI Series, and SMILES codes are directed to nonfunctional descriptive material. The limitations are directed to compilation of facts or data merely stored to be read without creating any functional interrelationship with the claimed subject matter. The MPEP states that when descriptive material is not functionally related to the substrate, the descriptive material will not distinguish the invention from the prior art in terms of patentability. For example, the claimed computer system differs from the prior art solely with respect to the limitation of LOPAC, United States Pharmacopeial

Convention Inc.'s USP DI Series, or SMILES codes, nonfunctional descriptive material, that cannot alter how the machine functions (i.e., the descriptive material does not reconfigure the computer). See MPEP 2106, §VI. Therefore, the cited disclosure of Ogata et al. is consistent with the required critical limitations claims 87, 88, 95, 144, and 145.

78. The inclusion of a document by Schena et al. is not being used as prior art but only to show the inherent properties of microarray expression arrays as cited above. Schena et al. discloses microarray expression data consists of ratio measurements and differential expression is derived from determining the order of magnitude changes for the intensity values wherein the potency of interaction is determined for the ratios greater a specified threshold (Schena et al., page 10615, column 2, lines 5-14).

79. Further, the process of generating gene clusters or gene expression profiles is a type of recursive partitioning, as in instant claim 92.

80. However, Ogata et al. does not disclose the limitation of a first database of chemical compounds that have failed in preclinical or human clinical tests, as in instant claim 17, an option of elected subject matter species.

81. Antman et al. discloses an improvement for "better databases" for the treatment of patients in clinical trials (page 240, Conclusions §). The method of Antman et al. comprises literature search for meta-analyses and randomized control trials using the MEDLINE database (page 241, column 2, last paragraph). The searches resulted in data directed to treatments that have no effect on mortality or are potentially harmful (page 240, Data

Synthesis §) and "negative trial, suggesting that the treatment does not work" (failed in human clinical tests) (page 246, column 1, "Negative" RCTs §). Antman et al. supports that the MEDLINE database comprises information directed to treatment therapies using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line), as in instant claims 17.

82. The citation of Ogata et al. (1999) taken with Antman et al. (1992) as directed to Internet based systems connected via the World Wide Web could reasonably be interpreted, by one of ordinary skill in the art at the instant time of the invention, as a "computer system." For example, KEGG is a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank and Medline (Ogata et al., Abstract etc. and page 30, Table 1). Antman et al. supports that the MEDLINE database comprises information directed to clinical control trials using a plurality of drugs (compounds) and their effects on patients (biological systems) (page 241, column 3, lines 3 to last line).

83. An artisan of ordinary skill in the art at the time of the instant invention would have been motivated by Antman et al. to recognize that clinical trial data corresponding to interaction test results and clinical trial data are available in MEDLINE. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the KEGG computer system comprising MEDLINE to search for interaction test results and clinical trial data as taught by Ogata et al. and Antman et al.

84. Claims 1-3, 10, 14-23, 27, 28, 33-53, 59-64, 70-76, 78, 80, 89-91, 93, 94, 96-105, 107, 120, 121, 124, 125, 127-129, and 132-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. (1998) taken with Antman et al. (1992) in combination with Wintzmann et al. (1994).

RESPONSE TO ARGUMENTS

85. Applicants' arguments on pages 83-84 directed to Goto et al., Bult et al., and Antman et al. have been fully considered and found to be unpersuasive as discussed above.

86. Specific to Wintzmann et al., it is noted that Wintzmann et al. has been specifically cited as being directed to claims 96 and 107. The instant rejection is related to claim 1 and 17 because the elected species of "failed in pre-clinical or human clinical test." The instant rejection is related to claim 10 because the elected species of "molecular targets which include receptors." The instant rejection is related to claim 59 because claims 96 and 107 are dependent from claim 59.

87. Goto et al. (1998) and Antman et al. (1992) disclose the limitations of claims 1-3, 10, 14-23, 27, 28, 33-53, 59-64, 70-76, 78, 80, 89-91, 93, 94, 97-105, 120, 121, 124, 125, 127-129, and 132-143 as discussed above.

88. However, Goto et al. (1998) and Antman et al. (1992) do not disclose the limitation of a first database comprising 2-D topological descriptors or LD50 data, as in instant claims 96 and 107.

89. Witzmann et al., as an exemplary type record from MEDLINE, discloses a method for the induction of enoyl-CoA hydratase by LD50 exposure to perfluorocarboxylic acids (compounds) and detected by 2-D electrophoresis. The inductions (effect) of peroximal

enoyl-CoA hydratase and other proteins of the peroximal β-oxidative pathway (biological system) were observed following single-dose exposure to each of the plurality of compounds (Abstract etc.). The records corresponding to the chemical compounds include 2-D topological descriptors (Figure 1), as in instant claims 96 and 107.

90. Goto et al. describes KEGG as a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank (Goto et al., Abstract etc., page 594, column 2, Results and Discussion §). The inclusion of Ogata et al. is not being used as prior art, but only to discuss that KEGG comprises GenBank and Medline databases via additional links (Ogata et al., page 30, Table 1).

91. An artisan of ordinary skill in the art at the time of the instant invention would have been motivated to recognized that the record type as exemplified by Witzmann et al. would be present in MEDLINE. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use the KEGG computer system via MEDLINE which comprises records corresponding to the chemical compounds that include 2-D topological descriptors as taught by Goto et al., Antman et al. and Witzmann et al.

92. Claims 1-3, 10, 14-23, 27, 28, 33-53, 59-64, 70-76, 78, 80, 89-91, 93, 94, 97-105, 120, 121, 124, 125, 126-129, and 132-143 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goto et al. (1998) taken with Antman et al. (1992) in combination with Schena et al. (1996).

RESPONSE TO ARGUMENTS

93. Applicants' arguments on pages 85-86 directed to Goto et al., Bult et al., and Antman et al. have been fully considered and found to be unpersuasive as discussed above.

94. Specific to Schena et al., it is noted that Schena et al. has been specifically cited as being directed to claim 126. The instant rejection is related to claim 1 and 17 because the elected species of "failed in pre-clinical or human clinical test." The instant rejection is related to claims 10 because the elected species of "molecular targets which include receptors." The instant rejection is related to claim 59 because claim 126 is dependent from claim 59.

95. Goto et al. (1998) and Antman et al. (1992) describe the limitations of claims 1-3, 10, 14-23, 27, 28, 33-53, 59-64, 70-76, 78, 80, 89-91, 93, 94, 97-105, 120, 121, 124, 125, 127-129, and 132-143 as discussed above.

96. However, Goto et al. (1998) and Antman et al. (1992) do not disclose the limitation of a second database comprising data organized by location of expression tissues as in instant claim 126.

97. Schena et al., as an exemplary type record from MEDLINE, discloses a method for characterizing the effect of phorbol ester on enzymes (molecular targets) such as oxidases, phosphatases, and kinases (Table 2) in a biological system wherein the data (records) are organized by location of expression in tissues (page 10618, entire column 2, and Figure 3), as in claim 126.

98. Goto et al. discloses KEGG as a Web based system which is networked to a plurality of databases such as chemical compounds, molecular targets from GenBank (Goto et al.,

Abstract etc., page 594, column 2, Results and Discussion §). The inclusion of Ogata et al. is not being used as prior art, but only to discuss that KEGG comprises GenBank and Medline databases via additional links (Ogata et al., page 30, Table 1).

99. An artisan of ordinary skill in the art at the time of the instant invention would have been motivated to recognize that the record type as exemplified by Schena et al. would be present in MEDLINE. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention was made to use KEGG via MEDLINE which comprises records corresponding to expression data as taught by Goto et al., Antman et al., and Schena et al.

CONCLUSION

100. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to (571) 272-0547. The USPTO's official fax number is (571) 273-8300.

101. Patent applicants with problems or questions regarding electronic images that can be viewed in the Patent Application Information Retrieval system (PAIR) can now contact the USPTO's Patent Electronic Business Center (Patent EBC) for assistance. Representatives are available to answer your questions daily from 6 am to midnight (EST). The toll free number is (866) 217-9197. When calling please have your application serial or patent number, the type of document you are having an image problem with, the number of pages and the specific nature of the problem. The Patent Electronic Business Center will notify applicants of the resolution of the problem within 5-7 business days. Applicants can also check PAIR to confirm that the problem has been corrected. The USPTO's Patent

Electronic Business Center is a complete service center supporting all patent business on the Internet. The USPTO's PAIR system provides Internet-based access to patent application status and history information. It also enables applicants to view the scanned images of their own application file folder(s) as well as general patent information available to the public.

102. For all other customer support, please call the USPTO Call Center (UCC) at 800-786-9199.

103. Any inquiry concerning this communication or earlier communications from the examiner should be directed to C. Dune Ly, whose telephone number is (571) 272-0716. The examiner can normally be reached on Monday-Friday from 8 A.M. to 4 P.M.

104. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ardin Marschel, Ph.D., can be reached on (571)272-0718.

C. Dune Ly
2/2/05

Ardin H. Marschel 2/6/05
ARDIN H. MARSCHEL
PRIMARY EXAMINER